COMMENTS FROM DAN WALL
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Comments on Draft Phase III Sampling and Analysis Plan, Operable Unit 3, Libby Asbestos Superfund Site, January 15, 2009

General Comments

The document is well organized and well written however there are several sections that are missing and potential activities are only referenced by a placeholder. After receipt of the January 15, 2009 Phase III SAP, EPA convened a meeting of the Biological Technical Assistance Group (BTAG) on February 4, 2009 to discuss the proposed sampling approach. After deliberation of the SAP by the BTAG, several changes to the SAP were proposed after some level of agreement was reached. No summary of these proposed modifications has been provided to members of the BTAG. Much of the discussion that occurred with members of the BTAG was focused on portions of the Phase III SAP that are only referenced by a placeholder. This makes it very difficult to provide meaningful comments on the technical integrity of the sampling plan without another opportunity to review the SAP in its entirety. Specific comments below should be viewed in this context.

Section 4.2.2.1 and 4.2.2.3

The SAP proposes to collect an additional 6 surface water (SW) Libby Amphibole (LA) samples at stations TP-TOE2, LRC-3 and LRC-5 on the rising and falling phase of the hydrograph near peak flow conditions. As stated in the text, this data is needed to evaluate associations that may exist between concentrations of LA in surface water and fish populations. Of the 7 on-site stations, 3 stations (TP-TOE2, LRC-3 and LRC-5) have not previously had measures of LA concentrations at high flow. Almost without exception, existing results indicate concentrations of LA in SW are highest during the peak flow in Rainy Creek and this may be a critical exposure concentration for a sensitive life stage of resident fish populations. It is agreed that this data gap needs to be filled. However, only collecting data from the 3 missing stations will not ensure comparability between all 7 onsite stations and the 2 offsite stations because of potential year to year variation in LA concentrations. It is the relative concentrations of LA in surface water between stations that are necessary to evaluate associations between LA and fish populations. A high or low runoff year will skew the results if only 3 of the 9 total stations are analyzed for LA. To ensure that the data usability is not compromised, concentrations of LA in SW under high flow conditions should be collected from all onsite stations.

Similarly, only a single data point under low flow conditions, exist for the 2 reference areas. These stations should be sampled at high flow to ensure that they are indeed free of LA.

Ultimately, if the technical issues with the fish toxicity test are not resolved, the best information for determining the level of risk to fish will be the association (or not) between LA in SW and fish populations.

Section 4.2.3.1

In the second to last paragraph it is stated that the reason for fiber loss in sample bottles was likely due to a biofilm because the fibers were released back into solution by ozonation. This statement should be modified to indicate that in addition to ozonation,

the sample was sonicated, treated with a salt solution and UV light. It seems unfounded to attribute the release of fibers solely to ozonation when these other methods were also employed.

Section 4.3.3.2 – Fish Toxicity Test

This section of the SAP is a placeholder pending discussion on whether, and how to conduct a toxicity test. The following comments are presented based the on proposed "Fiber Pilot Study Design" distributed on Feb 19, 2009.

1) Spiked vs Site Water – It is agreed that the spiking of laboratory water with the best available LA material is the best approach for the reasons outlined in the Fiber Pilot Study Design. Additionally, it is agreed that the flow-thru system is the best approach to avoid problems seen in the previous study.
2) Dose Selection – The study design proposes that the maximum exposure dose should be 30 MFL or greater pending input from the BTAG. Only limited information is available to determine, with confidence, what the highest concentration of LA will be on the site. However, existing information from onsite waters shows a couple values >1 BFL and several >100 MFL. If a toxicity test is completed with maximum doses less than the maximum values seen onsite and no toxicity is seen, it will be impossible to develop a protective no-effect concentration from the results. If no effects are seen and 30 MFL is selected as a protective concentration then there is a risk of unnecessary expensive remedial action to achieve 30 MFL. Considering that there is only one season of LA concentrations collected at high flow (when maximum concentrations are seen), it is a reasonable assumption that during years with favorable conditions higher values will be seen. Additionally, there is no information regarding concentrations during storm events or extended rain events. It is strongly recommended that the maximum concentration selected for the fish toxicity study be 10 BFL in order to establish a dose-response curve at environmentally relevant concentrations.
3) Analysis of Fibers – It is agreed that the use of PCM can save time and money when evaluating the utility of the proposed design. The study should be designed however, to specify that a subset of analyses by TEM are included to evaluate whether the testing apparatus does or does not result in preferential loss of fibers of a particular length thus altering the fiber size distribution. PCM may not be sensitive enough to resolve this issue. This may alter the toxicity of the material and is a necessary evaluation. The stopping rules should be adjusted to ensure that enough fibers (100 is recommended) are analyzed to allow for this determination. It is recommended that this be conducted for more than one dose at the time point before the loss of fibers is observed with PCM.

Section 4.2.4.2

Habitat factors may be affecting fish populations onsite and it is recommended that a quantitative evaluation be conducted. Additionally, Rainy, Carney and reference creek(s) need to be evaluated to determine if there are any areas containing barriers that are impassable for the fish species present on the site.

Section 4.2.4.2 – Step 4, Bobtail Creek

There is a placeholder suggesting that a discussion of the utility of Bobtail Creek tributary reference site will be inserted. At the outset of the implementation of the Phase IIC SAP concentrations of LA in SW in the upstream portions of Rainy Creek were unknown and it was determined that it would be risky to include this site as a reference. Two offsite stations were selected to serve as a reference. One of these offsite stations (NSY-R1) contains a very comparable mix of fish species and the other (BTT-R1) doesn't. The fish populations at BTT-R1 are comprised of Brook and Rainbow trout, two species that are considered competitors. In the Appalachian mountains Native Brook trout populations are being invaded by Rainbow trout populations and in some parts of the west, Brook Trout are outcompeting Rainbow Trout. The factors that determine the outcome of these competitive interactions are not fully understood but likely is a function of habitat, competition for feeding territories, predation and water temperature. Brook trout invade new habitat in pulses as opposed to steady expansion. It is unclear if, or at what stage of population interaction is occurring between the Brooks and Rainbow trout at BTT-R1. These interactions are not occurring at other stations included in this study and may result in increased variability or artificially elevated or suppressed fish population estimates when compared to other stations. For these reasons, it is recommended that this station be dropped from further sampling. Surface water results indicate that URC-1A has at most, very low concentrations of LA and would serve as a reasonable onsite reference in lieu of BTT-R1.

Section 4.3.4.1

Based on the presentation by Parametrix on Feb 19, 2009 it appears that there is significant variability associated with the Surber sampling. It is recommended that the sample be a composite of 5 samples as opposed to 3 as is currently written in the SOP.

Section 4.3.4.2 – Step 5, second italicized paragraph

The current RBP (http://www.epa.gov/owowwtr1/monitoring/rbp/index.html) does not contain the various biological condition score categories as presented in Figures 4-7 and 4-8 and is not prescriptive in how the data are analyzed. It does suggest that local (state) classification be evaluated when interpreting biological condition scores. Regardless, the decision rule presented in this paragraph, with the biological condition scoring categories presented in Figures 4-7 and 4-8 would result in a 49% reduction in biological condition score being deemed acceptable risk. A 50% reduction in the benthic community should not be considered protective. The exact % drop in biological condition score that is considered unacceptable risk will likely have some element of subjectivity but it is recommended that 76% and lower be considered an impaired biological condition score. This is generally consistent with the approach taken by the state of MT.

Section 4.4-Small Mammals

This component of the ecological sampling consumed a significant amount of time during the BTAG meeting in Denver and is particularly difficult to comment on because the "agreed" approach is significantly different than that described in the written

SAP. The following comments are to address what was discussed and what is written in a general manner, but an additional review of the draft final version is recommended.

General Comments

1) It is recommended that the sample area be expanded from what is written in the SAP to an area within the square comprised of SL45-02, SL45-03, SL75-02 and SL75-03 as was discussed in the BTAG. A grid or stratified random design that encompasses the entire area is recommended.

2) The sampling plan and discussion during the BTAG meeting ignores the "on-site" mine area (defined as habitat on or adjacent to the disturbed area). Significant habitat and the presence of small (and large) mammals and their sign have been observed in this area. It is likely that there are higher levels of available LA here than in the surrounding forest. If risk is observed in the proposed sampling area, then this shouldn't be an issue *if* the assumption is made that the mine must also pose a risk or alternatively, further characterization of the mine is proposed. If no risk is observed then further sampling of the mine should be performed to properly assess the spatial extent of the risk.

3) It's likely that a significant amount of variability exists in the distribution of LA in duff within the proposed sample area. A fundamental principle of risk assessment is to attempt to establish a relationship between exposure and effect. Neither the BTAG nor the SAP plans attempt to develop this relationship because only gross determinations (spatially) of LA in duff are proposed. It seems very inefficient to not sample duff in the immediate vicinity of a trapped animal during this mobilization.

Analysis of the duff could be done on a conditional basis. If no effects are seen *or* the effects are not significantly variable, the duff would not need to be analyzed because establishing a relationship would be unlikely. In the event that a range of effects are seen, the duff could be analyzed to attempt to establish a relationship. In the latter case, establishing a relationship between duff and effects will aid in the determination of the extent of residual risk (if any) which will be needed to assess the effectiveness of remedies to be considered in the feasibility study.

Mobilizing to recollect this data or resample small mammals to develop this relationship will greatly exceed the cost of conditionally analyzing the duff data collected during this event. It is recommended that a composite duff sample be collected from a 20 m perimeter around traps where animals are collected for processing.

4) The measurement endpoints described in the text and those discussed during the BTAG are very different. The primary difference hinges on the presumption that the histopathology reports will be able to definitively quantify abnormalities that are a result of LA exposure.

Based on this assumption, it was recommended during the BTAG that no tissue burden data be collected because a relationship between histological lesions and tissue burden is unnecessary because histological lesions will be diagnostic of LA exposure.

Additionally, based on this assumption, it was recommended during the BTAG meeting that the number of animals collected could be reduced from

20/species for 2 species to 10/species for 2 species. The rationale was that the definitive diagnosis of lesions caused by LA will by definition, result in a reference area with a score of 0 lesions caused by LA. This reduces the number of samples required to statistically compare the site and reference areas because the variability of the reference area is 0.

This assumption and the consequences that follow result in a sample design that has a high potential for failure and/or will yield results that provide very limited information regarding tissue specific exposure, the spatial variability of LA and the magnitude of potential risk associated with OU3. The latter point is critical to determining what types of studies are warranted if effects are seen in the proposed "high" offsite sample area.

Uncertainties associated with this approach are that differences exist in how animals respond to LA and what might be considered a typical asbestos lesion in a lab rat might look very different in a wild deer mouse or vole. For instance, species differences exist in their propensity to form asbestos bodies (a sign of previous exposure) and some species may not form them at all. Additionally, there can be many reasons that inflammation might be observed in a slide from a reference or site animal, but it is unclear how this will be linked to LA other than by a process of elimination. Are there other processes that can cause fibrosis in the lung that aren't related to LA that may not be immediately attributed to another cause?

There is also concern in human populations that asbestos exposure is leading to suppression of certain components of the immune system leading to systemic autoimmunity. This may result in a greater susceptibility to naturally occurring diseases that will not be directly attributable to LA.

In lieu of a detailed explanation of how the approach proposed in the BTAG meeting will be implemented, it is recommended that the measurement endpoints described in the SAP be implemented.

Section 4.5 - Birds

It was suggested during the BTAG meeting that this section of the SAP be removed from this years sampling effort largely due to logistical and workload constraints. In general this is a reasonable approach however, it is not clear when or if resumption of this piece of the sampling plan will begin. This needs to be clarified before a meaningful review of this portion of the SAP can be completed.

Also, during the BTAG meeting a brief discussion was had regarding the relative sensitivity of birds and mammals to the effect of asbestos. The decision was reached that the rationale for the assumption that birds are less sensitive to LA would be presented in written form. This is critical information for understanding the strategy of the risk assessment and deserves to be fully vetted by the BTAG. It is recommended that this document be distributed to the BTAG for comment. How EPA intends to deal with birds at OU3 needs clarification with an opportunity to comment on the proposed plan.

Section 4.6 Amphibians

This section of the SAP has also received a significant amount of discussion among the BTAG and it is unclear what the current proposal is. The SAP as written, proposes the use of a short-term standard laboratory toxicity test to measure the effects of

LA on a sensitive embryonic lifestage. The test will assess the mortality, growth and development but does not include metamorphosis. To assess the effects of LA on another sensitive life stage (metamorphosis) the SAP proposes to survey populations immediately after metamorphosis for malformations. These 2 measurement endpoints complement each other well and combine for a logical approach.

Discussions of this approach have revolved around a reluctance to conduct the field portion of the proposed SAP. The concerns are the cost associated with having to monitor tadpoles before metamorphosis and causality. If higher frequencies of malformations are observed, can it be attributed to LA? This is a reasonable concern that could be followed up with additional laboratory studies that target metamorphosis to determine whether LA is the cause of the malformations. Alternatively, a laboratory test could be performed that started at the embryonic stage and continued to through metamorphosis. If the latter strategy is chosen, then it would be important to determine which media is to be tested – SW, Sediment or both. Tadpoles are in intimate contact with both media and either or both could be a significant source of exposure.

As with other sections of this SAP it is difficult to provide definitive comments with several competing plans circulating either in writing or verbally,